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U. S. Department of Agriculture

BRANCH OF RESEARCH

MONTHLY REPORT

OF

DENDROLOGY

FOREST PRODUCTS

FOREST EXPERIMENT STATIONS

FOREST ECONOMICS

GRAZING RESEARCH

July, 1927.



BRANCH OF RESEARCH

July, 1927

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FOREWORD

THE TECHNICAL BULLETIN AS A WRITER SEES IT

(Continued from June report)

Journal of the American Society of Agronomy

Carleton R. Ball, Agronomist, U. S. Dept. Agriculture

MATERIALS, METHODS, AND CONDITIONS OF THE STUDY

This chapter of a technical bulletin is the basis of more controverted questions than almost any other. It explains the material used, the methods employed in doing the work, and the conditions under which it was done. Without a clear understanding of these facts, it usually is impossible for the reader to obtain a basis on which to judge the dependability of the results presented.

It is of primary importance that the material used in an experiment be clearly and accurately described. This is imperative if living material is used. Evidence of uniformity of the material is especially important if portions are to be subjected to different treatments and the results are to be compared, as is usually the case in most experiments.

The methods of performing the experiments and environmental conditions require clear presentation. The spacing of individuals or of rows, the number and the distribution of replications, and the physical environment (temperature, moisture, soil, etc.), all must be given briefly but clearly, if they could have influenced the results.

The sequence of the various experiments which make up the investigation in hand also is of primary importance to the reader. Some authors refer to them as Experiment 1, Experiment 2, Experiment 3, etc. This may be a satisfactory method if the total number is small. If the number is large, however, it is a severe tax on the memory to recall just which experiment was No. 3, or No. 6, or No. 10, as the case may be. It is preferable to use some key word or key phrase in designating each experiment, if possible. These key differences may be in the variety or strain of the organism, in the age or state of development of the organism, in the kind or quantity of chemical substance used, in the physical environment (light, temperature, moisture, etc.), or in something else connected with the technic. Usually, the necessary key word or the brief key phrase is easily selected. No matter what the designation employed, it is of the utmost importance that the sequence of operations be clearly shown.

(Over)

It may seem that the matter of attention to materials, conditions, and methods is being overemphasized. Let us consider the psychology of the investigator. He is concerned primarily with results and conclusions. They are the things of the immediate present which he is trying to set forth in a logical and convincing manner. Materials and methods, at this state of the investigation, are things of the past. They are of little immediate interest to him. Furthermore, he recognizes the importance of the results, while the materials and methods now seem relatively unimportant. They were all in his mind while he was doing the work, long before the results became apparent or the conclusions possible. He forgets, however, that they were not in the minds of others, and will never be unless he conveys them clearly. Many a good paper has been spoiled because these facts were so imperfectly presented that the reader could not determine from the text how the experiments had been conducted and, therefore, whether the results were accurate and the conclusions justified.

There is a pioneer publication presenting the results of early field investigation which is a striking example of this fact. It presents certain textual and tabulated data and arrives at certain conclusions. It does not state the location of the experiments. It does not give the duration either in total time or in the actual years covered, and it omits all mention of the methods of conducting the investigation. As a piece of scientific writing, it is practically valueless.

New Terminology.—This is a phase of the discussion of materials and methods which entails heavy obligations. Often these obligations are not recognized and met. In the rapid development of new branches or phases of science, it is necessary that new terms be created to express the new ideas involved. Each worker may find it necessary to devise new terms. It is easy to launch a term which sounds well but means something quite different from what the average reader would understand it to mean. It is almost impossible to correct this impression, once established. A case in point is the term "biologic form," which has been used so extensively in the literature of rusts in the last ten years. Biology is the science which treats of living matter—life. The word "bios" means just that. A biologic form, therefore, is a living form. Obviously every organism in the animal and plant kingdoms is a biologic form under any reasonable definition of this term. Yet the phytopathologists wished to limit the meaning of this broad and comprehensive word "biologic" and make it apply to a fungus entity of the fourth taxonomic rank. Happily, the matter is now adjusted, through the work of a committee representing three great National societies, including our own, and the phrase "physiologic form" has been substituted for the objectionable and confusing one.

Definition of Terms.—Another obligation on the writer of bulletins is to define any new or unusual terms used in his paper.

This obligation also often is neglected. The worker is likely to devise and use the new terms long before he publishes his results. By the time his manuscript is prepared, the new term has become an old one to him. He may forget that others do not know or understand it and that a clear definition is required of him. There have been some striking and unfortunate examples of this practice.

RESULTS OF THE INVESTIGATION

Results may be presented in the form of text, tables, and illustrations. In any case, there is the utmost obligation for clearness and accuracy. The textual discussion should describe the conditions of each particular experiment so far as these are not covered in the chapter on materials, methods, and conditions. It should point out the principal facts which the experiment revealed, with appropriate reference to tables, graphs, or other illustrations. It should summarize briefly the conclusions which may be drawn. This should be done for each successive specific experiment of which the results are presented. Care should be taken to arrange these experiments in a logical order or sequence. In this portion of the manuscript the use of proper headings and subheadings is of the highest value to the reader.

The preparation of tables probably is the most difficult part and the least easy to change after once completed. It really is an art in itself and should be taught widely. The table is composed of three parts, the title or legend, the column headings, and the data.

The title should be full and complete even to the point of repetition of textual statements. This enables the reader who is attempting to compare the data in one table with those in another to determine quickly the contents of each and to be sure that he is comparing the right sets of facts. It also enables the reader certainly and quickly to connect any given table with the text discussing it.

Many table legends appear to be constructed on the theory that a bulletin or paper always is read from the beginning on to the very end at one sitting. This rarely is the case, at least after the first reading. A paper really is a reference work and the user should be able to study and interpret a table without much, if any, reference to the text.

The same sequence of phrases should be used in the titles of all related tables, in order that the differences of content between one table and another may be recognized quickly. Frequently there will be a series of tables differing one from another by a single variable. For instance:

"Table 1.—The ash content of irrigated wheat."

"Table 2.—The protein content of irrigated wheat."

Suppose, however, that this last has been written, "The effect of quantity and time of irrigation on the protein content of wheat?" No reader could be sure that the two tables covered different but comparable data from exactly the same experiment. Of course, both titles might preferably be in the fuller form last given.

No portion of a table is more neglected than the column headings. It is of the utmost importance that they show clearly, fully, and simply what data are placed in the subtending columns. Examples of carelessness and inaccuracy come readily to mind. Such practices place on each of perhaps hundreds of readers a burden of labor which should have been assumed by just one person—the writer. The obligation is for completeness, logical arrangement, and accuracy.

Even though a table title is full and complete, column heads should not be omitted. Rather than this, the title should be abbreviated. Recently a research bulletin presented ten correlation tables in which only the subject was named in its single column heads, while the reader was obliged to seek the missing headings for ten or a dozen relative columns in the title of the table. This makes for loss of time and vexation of spirit.

In arranging column headings, the universal rule is to proceed downward from the more inclusive to the less inclusive. Column headings really are vertical keys, similar to the horizontal keys used for delimiting species and varieties of plants and animals. The broader divisions are indicated first, and then the successively narrower subdivisions. The last subdivision naturally indicates the content of the individual column. In some cases, it is noted that writers put the lesser before the greater, or repeat the greater for each column.

It would be thought that little need be said about the data in the columns themselves. Unfortunately, long experience has proved that this is not true. There is a most tremendous obligation that the data be accurate. The intention of the writer always is good, but good intentions often are but paving stones for Hades and other hot places. Sometimes the individual data are incorrect. Sometimes columns are incorrectly added, and at other times the calculated averages are not accurate. As a result, the final data lead to erroneous conclusions.

Accuracy is more a matter of habit than of ability. Writers must strive to get the habit of accuracy. There is a certain publication of a research institution, from the pen of a man known internationally, the tabular matter of which is full of mathematical

errors. The subject was one of fundamental nature and of widespread interest in science and the bulletin has been widely used. It would be better had it never been written or published. Missing or incomplete data constitute another problem for the reader. Blanks or gaps in tabulated data should be explained clearly. Oftentimes blanks or dashes occur in tables, without explanation. The reader is left to guess whether the corresponding portion of the experiment was not conducted or whether the results were lost, or were negative.

THE SUMMARY

A concise summary of the results obtained and the conclusions drawn is an obligation on the writer. The research must be studied in detail by the specialist. Only the summary of results and conclusions will be read by others than the specialist. Even the specialist is entitled to get a bird's-eye view of the results, or to refresh his memory, without wading through many pages of detailed data.

The chief obligation is to see that the summary really summarizes. A recent paper carried a chapter headed "Summary and Conclusions." It actually contained not a single word of summary and the so-called "conclusions" were an entirely new discussion of qualifying data. Another obligation is to present the summarized data in the same sequence as the original detailed data and to insure that no important point is omitted.

THE LITERATURE CITED, OR BIBLIOGRAPHY

There are three important characteristics of a list of literature cited, or a bibliography, namely, (1) accuracy, (2) completeness of citation, and (3) arrangement. In the case of a bibliography there is an obligation also for thoroughness.

There is the same obligation for accuracy in a bibliography as in the other parts of a bulletin. This applies to the spelling of names, the transcribing of the title, the correctness of the citations of volume, inclusive pages and illustrations, and the date. Experience teaches that errors are to be found in bibliographies, as elsewhere. In larger institutions the references usually are verified by the library staff, but in most institutions, including some of the larger, this is not the practice. The responsibility then rests directly on the author.

Unquestionably, there should be conference and consequent agreement on the form of citations of literature. At present, there is the utmost and exasperating variation. Wherever possible, the title of a paper should be given in the original language. When the title of a paper is translated and the original title is not given, the translated title should be followed in parentheses by the

phrase "Translated from the German," or whatever the original language may have been. Where the original title is in Chinese, Japanese, Russian, Polish, Greek, Hebrew, Arabic, or some language not using the English alphabet, translation usually is desirable, and the omission of the original title may be necessary. Some authors, however, make a practice of translating titles from French, German, Italian, Swedish, etc., and omitting the original title.

For clearness, convenience, and accuracy, the inclusive pages and inclusive figure and plate numbers should be given instead of merely the total number of each. Some citations omit all reference to illustrations, others merely insert the abbreviation "Illus." In cases where the figures comprising several plates are numbered consecutively throughout the series of plates, some writers cite both the inclusive plate numbers and the inclusive figure numbers, thus creating a very erroneous impression of the total number of illustrations.

Writing, typing, printing, and reading citations of literature is a tedious and expensive process at best. The most simple form which tells the story clearly is the least expensive time, effort, and money. A simple and uniform practice has been adopted by many of the larger scientific journals. In the simplified form the words or abbreviations for volume and pages are omitted. The volume number is followed by a colon which, in turn, is followed by the inclusive pages. After this comes the designation of figures and plates, both inclusive, and then the date. This simplified practice has been adopted by such abstracting journals as Biological Abstracts and Botanical Abstracts, and by such biological journals as Botanical Gazette, Journal of the American Society of Agronomy, Journal of Agricultural Research, Plant Physiology, and many others. This simple and easy system is in striking contrast to the cumbersome citation used by some other journals in this country and abroad.

IN CONCLUSION

In conclusion, you will have noted ere now that this topic has been presented from the viewpoint of what the writer owes to his colleagues who must read. Scientific results are not largess to the inferior or alms to the needy. They are facts determined for the physical, mental, or moral welfare of mankind. In making their offering, the votaries of Science must be willing to give their best. Less than the best is unworthy of the writer and unfair to the reader.

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A WORD FROM BRITISH COLUMBIA

(From a letter from P. M. Barr to Munns)

"Until this year the work has been carried on by Mr. J. L. Alexander in the Coast Region and myself in the Interior of the Province. Mr. Alexander has resigned, however, to accept the position of Assistant Professor at the University of Washington and since April the work has been organized as a Division of the Forest Branch.

The program this year is as follows:

1. Mensuration. Mr. G. H. Barnes has been employed as Research Assistant in charge of this work, pending permanent appointment, possibly at the end of this year. In connection with the organization of our Provincial Forests, considerable data on Yield of the more important types of the Province has become imperative and all our mensuration work this year deals with the preparation of Yield Tables. There are three parties in the field on this work with a total of eleven men.

2. Management. (a) Douglas Fir Reproduction Studies. This is our most important silvicultural project in the Province and it is being continued this year by Mr. A. E. Pickford who has been Mr. Alexander's Assistant for the past three years. Mr. Pickford's main work this summer is a study of the factors responsible for the mortality of seedlings of Douglas fir and associated species during the first season after germination. In addition he has considerable re-examination work on plots established in previous years.

(b) Aleza Lake Forest Experiment Station. Mr. E. H. Garman is temporarily in charge of this station during 1927. The program for the year includes a study of the relation between soil moisture and survival of seedlings in the Spruce-Balsam type; a continuation of brush disposal commenced in 1926; studies of the cause and extent of decay in Balsam (Abies lasiocarpa) which is being undertaken by Professor Dickson of the University of British Columbia who is attached to our Division this year. In addition to three technical men the Station Staff includes a foreman, cook, compassman, teamster, and two or three axemen, in all nine or ten men.

(c) A survey is being made of the cut-over areas in the Sitka Spruce type on the Queen Charlotte Islands and along our North Coast, where the greater part of the pulpwood logging is being carried on. On this work Mr. W. F. McCulloch is in charge of this project with a compassman and launch engineer as staff.

3. Fire Studies. This includes two projects, the study of the operation and efficiency of the various types of spark arresters which are in use on locomotives and logging machinery in the Douglas fir region, and a study of the behaviour and control of forest fires under various conditions of weather, soil, and fuel. Each of these projects is being carried on by one man.

FOREST EXPERIMENT STATIONS

Washington

McSweeney Bill

Interest in the McSweeney Bill remains keen. So far a considerable number of organizations have already indicated their interest in the measure, as evidenced by resolutions which have come to our notice. Among these are the Junior Chamber of Commerce of the United States and the Natural Resources Division of the National Chamber of Commerce, the National Lumber Manufacturers Association, the Southern Forestry Congress, and others. The latest which has come to notice has been a joint resolution passed by the Wisconsin Legislature, memorializing Congress to pass the McSweeney Bill.

Ohio-Mississippi Valley Station

After considering a number of localities, Columbus has been decided upon as the headquarters of the Ohio-Mississippi Valley Station, in cooperation with the Ohio State University and the Ohio Agricultural Experiment Station. Director McCarthy has established an office there and is now assembling his force. Mrs. Louise L. Davis, from the Natural Bridge Forest, is assuming the principal clerk's duties at the station, and Ralph K. Day is being transferred from the Coeur d'Alene National Forest in District 1 to the new station as an assistant silviculturist. Kellogg is working in Washington on the flood control study, while Hanley is carrying on the field end of the work.

Allegheny Station

The middle of July Clapp and Forbes spent two weeks looking for a headquarters location for the new station. A number of points were visited in New Jersey, Pennsylvania, and Maryland, but as yet no decision has been made. The station members, however, are congregating; Miss Skamser having reported from the Rocky Mountain Station and O. M. Wood from District 4.

Washington Office

During the month Clapp, in company with Forbes, visited various points in the Allegheny region. Munns also left to visit some of the Stations through the North Pacific Coast. Eyre spent 15 days helping McCarthy by taking charge of his field crew until

McCarthy's headquarters were decided upon. Reineke left the latter part of the month for the Southwest and California Station to be gone about two months. Marsh also left the latter part of the month for an extended trip to the Lake States to visit the Taxation Inquiry and the Forest Products Laboratory. Sparhawk spent a few days at Cornell giving some lectures at the summer school. Chapline left the first part of the month for an extended trip throughout the West. After being absent from the office for some time, Bruce returned again to the Forest Service to be with us for another short period.

The Washington office was visited by a considerable number of station men during the past month for one cause or another. Among the visitors present were McCarthy, Kellogg, and Mrs. Davis from the Ohio-Mississippi Valley; Forbes, Wood and Miss Skamser from the Allegheny; Frothingham from the Appalachian, and Schoeller from the Jornada.

Flood Study

The preliminary outline for the Mississippi flood study was revised and put in more complete form for distribution and general use. Copies were mimeographed and sent to all those having anything to do with the study. A series of maps was decided upon and preliminary information concerning various features was brought together. It is hoped that most of the information can be brought together on maps, though additional data will necessarily have to be put up in written form. The basic maps were sent to the field and as rapidly as information is found in Washington, it is being sent to those having direct charge of a particular district. Reynolds and Kellogg are working more or less solely upon this undertaking at the present time.

New Instruments

From the description of the new "Fardi" Range Finder recently introduced by E. Leitz Company, New York, this instrument appears suitable for Forest Service work. The Service has therefore obtained the loan of one of these range finders and it is being given a thorough trying out in the field. The results obtained with this instrument will be given in a later report.

During July the library loaned 884 books and periodicals, and 123 members of the Service and others consulted the library in person.

During the month 281 books and articles were indexed for the card catalogue.

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NORTHEASTERN FOREST EXPERIMENT STATION

Mr. Dana made a short trip into the field the early part of the month, accompanied by Mr. Yrjo Ilvessalo of the Forest Research Institute of Finland, who is in the United States for several months' study. They visited the Harvard Forest, went to the Cherry Mountain sample plots at Twin Mountain, New Hampshire, going by way of Portland, Maine, and returning by way of the Yale Forest School Demonstration Forest at Keene, New Hampshire.

Dana spent the remainder of the month on the requirements report and the report on European forest experiment stations, both of which he wished to complete before his departure for Michigan.

Westveld was in the field with a party of three assistants, spending three weeks on the sample plots in connection with brush disposal and methods of cutting studies on the Cherry Mountain sample plots, and the remainder of the time in getting under way some permanent sample plot work at Sherburne, Vermont, which is being carried on in cooperation with the Vermont Forest Service.

At the fire weather station on the Harvard Forest, Gast and Stickel have initiated an experiment to determine the influence of insolation upon the drying out of the duff. Two areas have been set up in addition to the one in which the duff hygrometer for the E-5 project is located. By means of removable coverings made of various thicknesses of heavy cheese-cloth, one of these areas will be exposed to total light, one to 40 per cent of total light, and the third to approximately 80 per cent of total light. Each area will be equipped with the following instruments: duff hygrometer, duff thermometer, and one of Gast's thermocouples. By means of these coverings, it will be possible to expose the duff on the areas not only to various percentages of total light, but also to various intensities of relative humidity. This project should give some very interesting results, since it has been found that the temperature of the duff is important in determining the percentage of duff moisture.

Gast spent about a week at the Yale Forest School forest at Keene, New Hampshire, where he had an opportunity to discuss the question of light-recording instruments with Professor Toumey, Dr. Burns of the University of Vermont, and Mr. Grasovsky, research student at the Yale Forest School. Dr. Burns and Professor Toumey decided to adopt the Gast thermocouple in their future light investigations.

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OHIO-MISSISSIPPI VALLEY FOREST EXPERIMENT STATION

Gangway!

Zon, we are here!

The late Mississippi flood has served to launch the Ohio-Mississippi Valley Forest Experiment Station and so far the drive hasn't jammed.

The Station is located on the campus of the Ohio State University at Columbus, and is assured of the cooperation of both the University and the Ohio State Agricultural Experiment Station. Some of the reasons that brought it to this city may be of interest.

1. The Station is associated with a strong State University which is engaged in graduate and research work in fields very closely allied to that of the Station. We hope to profit by the contact.

2. Columbus is situated in a natural forest region, with farm woodlots adjacent and large tracts of good second growth forest a few hours away by motor transportation. A good market for forest products has already made intensive forest practice possible.

3. Transportation facilities are good by rail and roads.

4. A fine spirit of cooperation has been in evidence in the welcome received from both the University and the State Agricultural Experiment Station. The State Forest Service has been paving the way - shaping public opinion, acquiring land, and doing experimental work for about twenty years.

The choice of Columbus was most difficult because of a number of other most excellent opportunities which were offered.

Personnel

The Director, E. F. McCarthy has come to the Station by transfer from the Appalachian Forest Experiment Station.

Dr. Bernard F. Meyer has been appointed in the grade of Associate Forest Ecologist to become effective September 10. Meyer is now engaged in instructional work in the Department of Botany at the University.

Arrangements have been made for transfer from the Nezperce, of Ralph K. Day who will be assigned in the grade of Assistant Silviculturist. The time of his arrival has not yet been announced.

Two appointments have been made from the Junior Forester register. Leonard F. Kellogg and J. H. Hanley. Kellogg has been engaged in compilation of material in Washington in connection with the flood study. Hanley reported for work in Ohio.

The Station has been fortunate in securing the services of Louise L. Davis for clerk from the staff of the Natural Bridge Forest.

Several temporary assistants have been employed for field work during the summer, Harold Morey and Ray F. Bower. We have also secured for a short time, the services of Norman W. Scherer, who is already associated with the faculty of the Ohio State University.

Mississippi Flood Control

The staff of this Station has been hurried into the study of forests in relation to Mississippi floods even before office space had been acquired. This work is being actively pushed with the expectation of completing it by August 15.

Very material assistance has been given by several other branches of the Forest Service as well as by cordial cooperation from State Forest Officers. Dr. Charles R. Hursh and Ivan H. Sims were loaned by the Appalachian Station, O. M. Wood by the new Allegheny Station. Lewis R. Smith has been furnished for a short period from the staff of the Cherokee National Forest to cover the eastern section of Kentucky and V. H. Cahalane from the staff of the Pisgah National Forest to report upon the watersheds of the French Broad and Nolichucky Rivers. The entire staff of this Station is engaged in this study.

The work is primarily a compilation of material already available in the form of reports in both published and manuscript form and records furnished by State Forest organizations. The entire study is an excellent opportunity to compile basic information on the region covered by the Station, including records of topography, geology and soils, climate and cover.

Oak Study

Early in the month of July, F. H. Eyre and two assistants spent about a week in Southern Ohio securing material for the determination of yield in second growth oak. Further work on this project will be conducted by the staff of this Station following the completion of the flood study.

Visitors

The Station was honored during the first week of its existence by a visit from the Assistant Secretary of Agriculture, R. W. Dunlap.

APPALACHIAN FOREST EXPERIMENT STATION

General

McCarthy left on July 10 for Columbus, Ohio, to assume his duties as Director of the newly established Ohio-Mississippi Valley Forest Experiment Station. His loss is keenly felt by the Appalachian Station.

Korstian addressed the Duke University summer school students and faculty at Lake Junaluska on forestry in the Southern Appalachian region and the work of the Station.

Methods of Cutting Mountain Hardwoods

The field party under J. H. Buell which left Asheville on June 27 had covered by the last of July about 1,000 acres in the extensive survey of cut-over lands. The first half of July was spent on the Erwin District of the Unaka National Forest. There they studied two cuttings, one a 6-year cutting in the northern hardwood type, and the other a 3-year-old cutting in cove hardwoods.

The remainder of the month was spent on the Carter District of the same forest on several cut-over areas on Iron and Holston Mountains bordering Stoney Creek Valley. In this region the chestnut type predominates, but on an area near Buladeen, Tenn., considerable white pine was found in the original mixture. White pine seed trees were left at the time of cutting eight years ago and apparently the proportion of white pine in the second-growth will at least equal that in the original stand.

Chestnut acidwood sales have flourished in this section for many years, so that practically clear-cut areas have been found for study -- two of them having been logged 14 years ago. From an examination of chestnut stump clumps it is evident that these same areas were heavily cut 40 or 50 years ago, and local residents state that much timber was cut at that time for charcoal. Chestnut sprouts make up the bulk of the reproduction on these areas, and they are badly infected by the blight on most of the areas visited.

Frothingham, MacKinney, and Bradshaw joined the party near Elizabethton, Tenn., just before Sims left on the flood study. Bradshaw remained with the party but MacKinney was called back to Asheville on July 28 to take charge of the chestnut replacement field work.

Chestnut Replacement Study

Field work on the study of the nature and extent of replacement of blight-killed chestnut by other species was started on the

Bent Creek Experimental Forest near Asheville by Haasis, MacKinney and Field Assistants Northstein and Ziegler. Korstian made several trips to Bent Creek to assist in organizing the work.

Haasis unfortunately had to undergo an operation for appendicitis on July 23, after which MacKinney took charge of the party. The work during July consisted in laying out two one-acre permanent sample plots on areas where the chestnut had been salvaged and two one-acre plots in uncut areas. On all of these plots individual tree descriptions were taken of all trees over 2.5 inches in diameter and crown projection maps made for the purpose of showing the filling in of the blanks in the canopy left by the cutting or death of the chestnut by the blight.

On the cut-over areas four milacre plots (6.6 ft. square) were established in the openings left by the cutting of the chestnut. From these plots it will be possible to determine the character and abundance of the replacement reproduction. On the same areas milacre plots were also established around trees of other species to serve as check plots.

The same general procedure was followed on the areas reserved from cutting except that the milacre plots instead of being put around chestnut stumps were located around living chestnuts. These areas will be used as checks on the cut-over areas and in the study of the replacement of chestnut in undisturbed stands as compared with stands from which the chestnut was cut. These plots will be of considerable value in the methods of cutting study when they are no longer needed in the chestnut replacement study.

Flood Control Study

Hursh and Sims were detailed to assist McCarthy in the study of forest conditions in relation to run-off and erosion. Frothingham accompanied Sims to West Virginia to begin the work. They visited Bluefield and through the courtesy of Thomas H. Clagett, cf the Pocahontas Coal and Coke Company, were shown a considerable area of the Bluestone River drainage in southern West Virginia. They then followed the Bluestone to its junction with the New River and went up the Greenbrier to its head, following down the Monongahela drainage to Elkins and Buckhannon, W. Va. Frothingham and Sims also visited the Forest Service nursery at Gladwin, W. Va., and called on State Game Protector A. B. Brooks at Buckhannon. Frothingham spent two days in Washington before returning to Asheville.

Joint Visit to Lookingglass Rock Plots

On July 14, Korstian, Nelson, Beal, St. George, Balch, and Professor and Mrs. Dracea from Roumania, visited the yellow poplar

release cutting plots at the base of Lookingglass Rock in the Pisgah National Forest. Korstian explained the experiment to the party and the plots were examined particularly for evidence of locust borers and chestnut blight.

The yellow poplar and black locust were especially thrifty and vigorous looking. The locust was protected by hardwoods for several years and now occupies a place in the overstory and is free from borer work. Practically all of the locust observed growing in the open and not protected by shade is severely damaged by locust borers. These observations confirm Dr. Craighead's conclusions that shade is an important factor in protecting young locust trees from borer injury.

In the vicinity of Lookingglass Rock 75 per cent or more of the chestnut is infected with blight, while in the Pigeon River Valley to the west of Pisgah Ridge only about 10 per cent of the chestnut is infected. The chestnut in the vicinity of the plots is showing a much higher mortality now than in the spring when the plots were reexamined.

Forest Insect Studies

Stanley Garthside, forest entomologist from Sidney, Australia, arrived in Asheville on July 10 and spent a few days at the Bent Creek laboratory to note the entomological studies being conducted there. Mr. Garthside is travelling under the auspices of the Australian Government and expects to visit stations in the various parts of the United States, Canada, and Europe before returning to Australia in 1928. He has just completed some studies at Cornell and expects to attend the University of Minnesota this fall to continue his studies.

An outbreak of the hickory bark beetle (Eccoptogaster quadrispinosus) was discovered at Swannanoa, N. C. It has been in progress since the fall of 1925, when the severe drought weakened many hardwoods and conifers. The outbreak was rapidly increasing and if it had not been checked would undoubtedly within the next two or three years have killed all the hickories in the vicinity.

The southern pine beetle (Dendroctonus frontalis), inactive since spring, was discovered in numbers during the past two or three weeks.

Pathological Studies

F. C. Strong, instructor in Pathology at Michigan State College, East Lansing, was appointed field assistant in the Office of Forest Pathology for the summer of 1927, and is working with Nelson.

The rapidity with which the chestnut blight is spreading in the Southern Appalachians presents a serious problem to the tannin extract companies located in this region. An extensive experiment has been carried on for the past three years by the Office of Forest Pathology in cooperation with leather chemists. It is expected that, when the experiment has been completed, the information collected will permit the prediction of the probable reduction of tannin content of blight-killed chestnut trees left standing for a considerable length of time. The collection of a large number of specimens for tannin analysis from different sections of Virginia and North Carolina was completed at Cruso, N. C., during the first half of the month of July.

A scouting trip will be made during August in Georgia, Alabama, North and South Carolina, and Tennessee to obtain additional information on the rapidity of spread of the chestnut blight.

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ALLEGHENY FOREST EXPERIMENT STATION

Although the Station celebrated its establishment on July 1, and is glad to make its bow to the readers of the Monthly Report, only the two field assistants, J. C. Craig and D. P. Kirkham reported on that date. Director Forbes arrived in Washington, which is all we have in the way of a headquarters as yet, on the 8th; Junior Forester Wood and Chief Clerk Clara E. Skamser, on the 19th. Junior Forester Hough is still abroad. With the new Silviculturist register in hand, we are developing plans as rapidly as possible for the completion of the staff of six technical men.

Assistant Forester Clapp and Director Forbes spent ten days on a tour of the territory, in an endeavor to determine on a suitable headquarters. They were so cordially received at a number of points that the difficulty of reaching a decision has been materially increased. Unfortunately no one place seems to have all of the qualifications we should like to see in our headquarters, in spite of the highly persuasive presentation of the merits of several by those interested in having us come there. Forbes spent considerable time in the office compiling various data which will be helpful in arriving at the soundest answer to a very perplexing question.

Mr. Wood had no sooner reported than he was drafted for the flood control study, to compile the data on the Allegheny watershed for McCarthy of the Ohio Valley Station. Miss Skamser has taken advantage of her temporary location in the Atlantic Building to learn something of the inner workings of the Branch of Research. The services of Messrs. Craig and Kirkham have been loaned to Mr. MacIntyre

of the Pennsylvania State College, who has begun an extensive survey, similar to the surveys undertaken at several of the other eastern stations, of the scrub oak type in the vicinity of State College. This type promises to absorb a lot of our time when we get underway, and we are delighted to have Mr. MacIntyre reconnoiter the ground. Our cooperation in the study is only the first of many similar arrangements which the Allegheny hopes to enter into in the future.

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SOUTHERN FOREST EXPERIMENT STATION

General

Forbes left us on the fifth to assume the directorship of the new Allegheny Station. He had been director of the Southern Station since its establishment in 1921 and during these six years had endeared himself to all of his coworkers. The Southern, and that means each one of us, deeply regrets his leaving and he has our very best wishes for success at his new post.

Demmon has been appointed Acting Director until Forbes' successor has been selected.

On the first of the fiscal year the Station received an increase of approximately \$2500 in its allotment which will go to provide for a junior forester and a stenographer at the Starke Branch Station. Verne L. Harper, who was appointed from the Junior Forester register, reported for duty on the first of July. He spent several days in New Orleans before proceeding to his permanent station at Starke.

Demmon, Wahlenberg, Wakeley, Barrett, and practically the whole clerical force were engaged on the Mississippi flood control study, in which the Southern Station has been asked to participate. This is proving to be a huge job in the collecting and compiling of data.

Prof. R. W. Hayes of Louisiana State University forestry faculty has been appointed temporarily to work on our projects at McNeill.

Measurements

A few days were spent by Hayes in obtaining field data for an accelerated growth study of longleaf pine, in connection with work on our grazing project at McNeill.

Management

Barrett spent a day or two on the thinning project at Urania.

Gemmer worked for several days on a revision of the working plan for the natural reproduction study on the Choctawhatchee. His phenological notes taken on the Choctawhatchee Division of the Florida National Forest show that slash and sand pine had two or three distinct periods of growth during the past spring; the longleaf shows two, rather indistinctly marked by a slowing down during the drought. Slash and longleaf have both slowed up in growth during the last 10 days in July to the extent that this year's growth will probably have been completed early in August. All pines have formed winter buds since July 6.

Naval Stores

Wyman reports that July was uneventful so far as the naval stores work is concerned. On account of being shorthanded it was necessary to use the chipper on dipping work so that no streak was put on during the first week of the month. The third dipping of the season was made at the Kingsley Lake and Sampson Lake areas during the month. The gum flow has fallen down recently on account of frequent rains and possibly also because the trees were weakened as a result of the prolonged dry spell during last April and May.

Considerable progress was made on checking of the office records of the Sampson Lake tract, and summaries by diameter classes, crown classes, and current growth were completed for all of the groups which were started in 1923.

Forestation

Gemmer reviewed the major portion of the history of seeding and planting on the Florida Forest since 1911.

Gemmer and Supervisor Shaw of the Florida Forest worked on a forestation plan, drawing up an assignment of definite tasks for each member of the force. This work will be definitely tied in with the research program so that careful records will be kept of each operation from collection of seed to the end of the planting.

Protection, Others

Grazing. Demmon spent two days with Hayes at McNeill, in getting a start on the field work to be done there in connection with the Pa-l project.

Insects. Gemmer notes that flathead borers are attacking a large number of the old trees, no doubt due in part to weakened condition caused by the recent drought. These attacks seem to be confined entirely to the cambium region.

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CALIFORNIA FOREST EXPERIMENT STATION

General

Professor Hesselman's trip in California covered practically all of the principal timber types. He was particularly impressed with some of the groves of Sequoia, the magnificent stands, and the favorable forest conditions in the redwood belt. Professor Hesselman's extreme modesty and scholarly caution caused him to hesitate in making any comparisons between conditions in America and in Europe. He was, however, impressed, as he expressed it, with the extreme dryness of our forests and the compactness of our soils, the deficiency of humus and the rapidity with which decomposition of litter and humus progresses in California. "No wonder," he stated, "that European foresters fail to appreciate your enormous fire problem inherent in the forest itself." He sensed the damaging effects of forest fires in our pine region, not only in the reduction of growing timber, but on the soil itself. He appreciated why American foresters must give so much time to the study of fire and its control. Needless to say, Professor Hesselman's visit was enjoyed by all foresters who came in contact with him in his sojourn here.

The agreement, mentioned in a previous report, with the State Forester for the support of the work of the Station has finally been signed. This may be of interest to other Stations in that the State Forester's budget provides a regular item for cooperative work with the Station, the funds being directly available after the projects have been selected.

Cover Type Map

One party is working on the cover type map, covering the lower foothill regions outside of the National Forests. At the rate the work is progressing now and with the data already at hand on the National Forests, the cover type map for the entire Sierra region should be completed at the end of the field season. The State Forester has assigned one technically trained forester as a nucleus for another crew on the mapping project.

Management

Much of Dunning's and Siggins' time has been taken up on the preliminary examination of two new permanent plots and the annual examinations of reproduction plots. Fences are now being constructed to prevent damage by stock on some of the plots on the Stanislaus.

Slash Disposal

Wieslander, in addition to his cover type work, examined an area on the Lassen Forest in the yellow pine-fir type for the purpose of initiating an experiment for studying the effects of slash on vegetation, soil conditions, and the rapidity with which slash decays. This work is being handled in cooperation with the Office of Plant Pathology.

Fire Studies

Favorable climatic conditions and unusually good work on the part of the administrative organization has made it impossible so far to undertake the study of going fires. Kotok proposes to make preliminary studies on at least three reasonably large going fires for the purpose of working out a technique. Two months are left of the fire season, and there may still be an opportunity to do some work on this project. The difficulties and uncertainties in reaching a fire in time to conduct any study prevents planning the work in advance with any definiteness. In the meantime, for the sake of the administrative organization, we hope that studies of large fires may be deferred indefinitely.

Kotok and Dunning made an examination of the Kern Ridge fire plots on the California. These plots were burned in 1920 and subsequent examinations are being made to determine the vegetative succession that takes place. The area covers the edge of the yellow pine type where brush fields of oak and manzanita are in competition with the timber. The original fire set back the forest and the brush invasion is proceeding with great rapidity. In the case of the manzanita, the extension is chiefly through seedlings, not through sprouts. Parts of the plots, however, show a slow return of coniferous seedlings which it is safe to say will recapture the area if further fires are excluded.

Experimental Forests

The Butterfly and Black Hawk areas adjacent to the Feather River substation were examined and a type and site class map made of parts of the area. Another examination will be made for the purpose of determining methods of cutting. These areas will form part of the future experimental forest in this region.

Southern California

Lowdermilk and Kraebel spent most of their time on the Barranca Burn, establishing vegetative succession plots. A

progress report of the work accomplished in the south has been issued to cooperating agencies. We are now trying to establish a budget system for the work in the south where each of the important counties are asked to contribute about \$2000 per year for the southern work. So far three counties have already acquiesced to this arrangement.

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

Munger returned from his five-weeks trip in Alaska on July 31. On this trip he obtained a very comprehensive idea of forest conditions in southeastern Alaska and of the particular forest problems that demand early study. He had some time with the two technical assistants who are now doing research, and was accompanied by either District Forester Flory or Assistant District Forester Heintzleman most of the time. On the conclusion of this trip he prepared a long memorandum making suggestions as to a program and organization of forest research in that portion of District 8 involved in pulp-timber activities.

Meyer with his two assistants, Wendall Moran and Daniel Janzen, was in the field throughout the month continuing the work of investigating stands of second growth Douglas fir with the view of obtaining principles of applying normal yield tables. Among the many interesting questions arising is that of extremely local variability of site as reflected by the height of trees. One especially interesting case was seen in the vicinity of Marblemount, Washington, on Bacon Creek. Over fifty years ago a fire swept through a then twenty-year old stand of Douglas fir on both sides of the creek. On the one side of the creek, where the slopes have a south and southwest aspect, is a patchy stand of the fifty and seventy-year age classes. On the opposite side with north and northeast slope only the younger age class is present. However, the chief contrast lies in the fact that on the south and southwest slopes the site changes from a Site III (site index 140) at the very base, to a Site IV and Site V and poorer (site index 60), immediately as the steeper exposed slopes are reached. Each slight ridge accentuates the poorness of site greatly. On the opposite slope, however, the site quality remains practically the same, namely Site III (site index 135), although the slope per cents are much greater ranging from 65 to 115 per cent, compared to 10 to 60 per cent on the other side. In a number of other cases in other portions of the Douglas fir region this site variability on the south and southwest slopes was equally evident but no direct comparisons, as could be made on the Bacon Creek area, were available. Local variations of aspect of land combined with the steepness of slope, rather than steepness alone, affect the moisture relations so drastically that even in this humid climate tree growth is materially affected.

Isaac with an assistant spent the early part of the month in the Wind River valley on the Douglas fir natural reproduction study. Instruments were set up and continuous readings started on plots where an intensive study is being made of the factors influencing natural regeneration. Conventional weather records are being taken and also maximum and minimum soil temperatures at surface, three, six, and twelve-inch depths, and soil moisture determinations at three, six, and twelve-inch depths to correlate with wilting coefficient and root penetration of seedlings. The work is being seriously hampered by a lack of seedlings in spite of the fact that the plots were very heavily seeded last fall.

On July 10 a trip was made to Goose Lake on the Carson-Guler road and it was surprising to find 4-foot snow banks and coniferous growth just starting, while leaders were a foot long in the Wind River valley 2500 feet lower down.

During the latter part of the month a circuit was made of the three groups of sample plots in the lower Columbia region. A study of the cone crop in various parts of Washington and Oregon indicates that the Douglas fir region is facing the fourth successive light, uneven cone crop which will doubtless result in a scarcity of seedlings in 1928.

Westveld examined the two yellow pine slash disposal plots early in June and found nearly twice as many subsequent seedlings on the plot on which the slash was left as it fell as on the plot that was piled and burned. The fact that the two areas were logged in September indicates that a considerable amount of seed was probably burned on the latter plot. The remainder of the month was devoted to establishing three methods of cutting plots. On one plot all the mature and decadent yellow pines were marked for cutting and a thinning made from underneath in the bull pines. On the other two plots the bull-pine groups were left intact. On one of these areas only the overmature trees were marked for cutting, and on the other all yellow pines except a sufficient number for seed to complete the stocking of the area, were marked.

The Shevlin-Hixon Lumber Company at Bend, Oregon, which has been so successful the past few years with intensive protection on their cut-over lands where the slash is let lie, is trying some new ideas this year. Narrow belts of timber have been left along some of the railroad spurs which can be logged conveniently at a later date to break up the continuity of the slash. Furthermore, additional abandoned railroad grades have been converted into auto roads to make the entire cut-over area easily accessible by car.

While McArdle, who is assigned primarily to a study of going fires, has been waiting for some good-sized fires to happen along, he and his assistant have been working out the details of the Douglas fir slash disposal study. Twenty sample plots each an acre or

occasionally one-half acre in size were laid out and all slash on each plot measured and described. Considerable assistance was had from the waste survey crew of the office of Forest Products, and it is possible that some of their measurements may also be used in the slash disposal project. Dr. Boyce spent several days with McArdle in the field going over on the ground the various aspects of the project which will be worked out by the plant pathologists. A circular letter sent to the members of the Advisory Council brought a number of helpful suggestions to guide in the conduct of the study, and much valuable advice has also been received from logging superintendents during the course of the survey. If a satisfactory technic can be evolved work on this project can be begun on a large scale next season.

Two and one-half gross of railroad fusees were distributed to several Forests, to fire patrol associations, state foresters, and logging superintendents for experimental trial. If opportunity offers these will be tested to see if they can be used as back-firing torches to supplement the Hauck torch. The yellow fuses burn ten or twelve minutes, develop a temperature of 2000° F., and are light in weight. Half a dozen fuses may be carried in a hip pocket, and if lighted in succession will burn about one and one-half hours.

Among the visitors during the month was Dr. Henrik Hesselman, Director of the Forest Research Institute of Stockholm, Sweden. With McArdle and Kummell of the District Office he visited some of the forest types of the region and spent one day in the vicinity of the Wind River Branch Station. Mr. Leo Nash and Mr. Harold Nash, who own pulp mills in Wisconsin, were in and spent about one-half day getting information on location of hemlock and spruce stands, amount of timber, etc.

Most of Simson's time this month has been taken up with inflammability tests and static observations. Even those materials considered most inflammable are found to be surprisingly hard to ignite by coal, spark, or flame in the absence of draft.

The persistence of fire in spite of rain was well demonstrated at Wind River in June. Munger and Isaac saw a bolt of lightning strike and shatter a snag in an old burn during a heavy shower of rain. It rained .2 inch at the weather station five miles away just before this electric storm and continued afterwards. Yet the next morning this snag and 23 others over the adjoining five or six acres were afire.

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NORTHERN ROCKY MOUNTAIN EXPERIMENT STATION

The reproduction study crew consisting of Marshall and three field assistants put in the entire month in establishing permanent plots and quadrats on several of the big Kaniksu burns of last summer. Four large plots and 354 quadrats were established. Two of the plots, 7 and 8 acres in size, are gridironed with screened and unscreened quadrats to determine the effect of stored seed and seeding from the overhead trees still living. The other two plots comprise lines of twin quadrats radiating, in the direction of the prevailing wind, from a group of seed trees and a solid body of green timber. These quadrats occur at intervals of one hundred feet on lines from several hundred to 1900 feet long. The object is to determine the distance of effective seed dispersal and other effects of seeding from the side. In all cases the living and fire-damaged seed trees are tagged and will be observed annually for seed production and death or survival. Likewise the seedlings in the quadrats will be staked and examined annually. The unscreened quadrats are mil-acre in size and the screened ones one-quarter that size.

Marshall reports some interesting temperature measurements taken in the top 1/4-inch of soil in screened and unscreened quadrats. A variation of 0 to 14 degrees Fahrenheit was found on quadrats of comparable site conditions. In other words, the screens had a tendency, as one would expect, of making the site cooler. The screening being used is 12 mesh and the frames are 8 inches or more above ground. When the 1/4-inch soil temperature remained under 100 degrees the difference between screened and unscreened quadrats was slight. A maximum soil temperature at this depth of 132 degrees was obtained on a denuded southwest slope. The air temperature at this time was 106 degrees. In this connection, by the way, Marshall writes that the air temperature on the bare and blackened burns has probably been above 100 degrees every afternoon for the past week or two, which gives a picture of the none-too-envious conditions under which the crew is working. They would not hesitate to change places with men working on sample plots in the shade of green timber.

It may be of interest to other Stations to know that we had our screened frames made to order. Bids were called for from several woodworking shops, and the job of making 350 of the frames was awarded to the Exchange Lumber Company of Spokane. The frames cost about \$1.05 apiece f.o.b. Spokane. Although the total cost figures are not yet available, it is believed that the expenditures for freight, truck transportation and additional screening (to close in the sides between the frames and the uneven ground surface) will bring the total cost to about \$1.50 each.

An abnormal lack of large forest fires so far this season has permitted Gisborne to give more time than he expected to that

phase of fire studies which deals with the relation of wood moisture to wood inflammability. For the duff we know dependably the degree of inflammability according to its moisture content; we do not know the moisture contents of wood which render it noninflammable, ignitable after considerable exposure to flame, after a short exposure, or that degree of dryness which causes wood to be called "dry as tinder."

It seems reasonable to suppose that small sized pieces may be more easily ignited than large ones, even though both have the same moisture content. It is also known that the arrangement of the pieces, one to another, is an important factor influencing ease of successful ignition. The present work is largely aimed at developing a technique of studying these relationships, but the results also may be expected to assist in determining the degree of prevailing and probable fire danger according to the measured amount of moisture in different size classes of wood.

Last fall Gisborne collected white pine sticks from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches in diameter which had been killed but not burned by fire, and from which the bark had fallen naturally -- thereby eliminating the variable ignitability caused by loose bark. These samples were then cut in 12-inch lengths, sorted by $1\frac{1}{4}$ -inch diameter classes, and the oven-dry weight of each batch determined. Since then the material has been stored in a cool, humid chamber, so that all the pieces can pick up as much moisture as could possibly be expected from sustained high humidity, but not rain. After eight months of such absorption, it is now assumed that the samples have relatively high moisture contents and that this moisture is evenly distributed throughout each piece. The exact amount of moisture and its distribution will be determined by weighing and by dissection before the inflammability tests are made.

The problems at present are: how to arrange the pieces, what source of ignition to apply, how to determine that ignition has occurred and that combustion will continue if the source of flame is removed, and then to rate the relative inflammability of the various size classes at the moisture content of these samples. This appears to be a hitherto unexplored field, insofar as Gisborne and his assistant, Koch, a graduate chemistry student, are able to determine. Any references to similar work will be gratefully received by us. Actual burning tests with carefully prepared material are being held up until the governing fundamentals are understood as clearly and as thoroughly as possible.

Word from Haig, who is still engaged on the yield study computations at Washington, is that the advance issue of the normal yield tables will be out in September. Sufficient progress has been made to show some differences between the new tables and

the ones we have been using for the last few years. One example of this is revealed in the following comparison of average dominant heights for Site II of the old table and site index 58 (average site index) of the new table:

Age	Ave. Dominant Height in Feet			Deviation in Ft.
Years	Old table	New table		Old from new
	Site II	Ave. site index		
:	:	:	:	:
30	50	28		+22
70	99	83		+16
110	128	120		+8
150	142	137		+5

Without going into the details of how this comes about, it is interesting and somewhat disturbing to note that the discrepancies in height over age are not consistent; in other words, the site classification curves of the two tables are not similar in shape. The curves for the old table are too high for young stands, with the result in using them that actual stands of such height would show erroneous and discouragingly low yield predictions.

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SOUTHWESTERN FOREST EXPERIMENT STATION

The station force has been augmented by the assignment, through cooperation with District 3, of Junior Forester Bert R. Lexen. Mr. Lexen is a graduate of Michigan. He comes from District 4 where he has served two years as ranger on the Weiser.

Dr. Henrik Hesselman, Director of the Swedish Forest Experiment Station, spent a week with us during the fore part of the month. Advantage was taken of the opportunity to discuss our soil and other ecological problems with this eminent authority. His diagnosis of the soil difficulties in our yellow pine type is that a naturally heavy soil has been rendered still more heavy and impervious through the decrease of organic matter as a result of fire and overgrazing. While the loss of nitrates is reflected in a slow growth, the most adverse effect is in the poor physical condition of the soil. Tramping by livestock and logging on wet ground are probably contributing factors. The presence of sand and gravel takes the place of organic matter to a certain extent in promoting permeability. The only practical remedy, however, lies in adding organic matter by maintaining closed stands and preventing fire and overgrazing.

In the Engelmann spruce and Douglas fir types the problem is different. Under closed stands and in small openings on north slopes, particularly in the Engelmann spruce type, there is often a "raw humus" similar to that found in northern Sweden. Organic matter is abundant, but it is only partially decayed because of deficient light or heat. The normal process of nitrification is not carried to the ultimate stage, and thus we probably have nitrogen compounds which are not available or may be positively injurious to young seedlings. Here the relation is chemical rather than physical. The remedy lies in judicious opening of the canopy - just enough to encourage nitrification without excessive drying of the surface soil.

The foregoing theories are plausible in the light of our experience with natural reproduction, and they suggest a fertile field for experimentation. Dr. Hesselman suggested a series of pot cultures with pine and spruce in soils from various situations.

Bates stopped off several days primarily for the purpose of discussing research problems which might lend themselves to cooperation with the new Biological Section of the Products Laboratory. If the soil studies outlined by Dr. Hesselman are undertaken, it seems that the Biological Section might render valuable assistance in physical and chemical tests of the various soils. Such an investigation should prove of more than local importance in relation to the reproduction of western conifers.

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ROCKY MOUNTAIN FOREST EXPERIMENT STATION

Because of the very significant changes involving the transfer from this Station of both Mr. Bates, Director, and Miss Skamser, clerk, much of Bates' and Roesser's time during the first half of the month was taken up by activities of more or less administrative nature. Bates completed reports for practically all of the projects under his direct supervision, with most of this time devoted to bringing up to date the T-5 soils study. On the 17th he left for California on work in connection with his new position at the Forest Products Laboratory. Needless to say, his transfer, after eighteen years with this Station as its organizer and director, will be keenly felt by District 2 and by the Pikes Peak Region in general, which called upon him constantly for advice in things of a forestry nature. Miss Skamser left on the same day for her new position with the Allegheny Station, after serving the Station as clerk since 1920. Roesser has assumed the duties of Acting Director, and for the next fiscal year at least, the Station will function on a greatly reduced appropriation.

Considerable improvement work at the station was undertaken during the month, this being primarily in the way of giving all the buildings a new coat of paint of standard colors. Some work was done toward completing the thinning of plots in Douglas fir and Engelmann spruce marked last fall under the M-1 program.

During the latter part of the month Roeser spent one week on the Pike plots near South Platte. The effect of grazing upon planted yellow pine stock and upon erosion on a denuded over-grazed area is being studied. Two sets of counting plots within and without the fenced area have given contradictory survival results in years past. As far as a hasty review of results obtained this year indicates the rate of survival and growth on comparable areas established in 1923 (four years after planting) is practically equal, although for equal areas, the fenced area has more trees and these are somewhat larger than those outside. No great difference is to be noted in the distribution and abundance of forage and herbaceous plants on the two areas except that those outside the fence have been pretty well cropped. Probably the most obvious effect of over-grazing concerns erosion; for a hasty comparison of measurements at erosion points indicates more side-cutting and washing out and also more accumulation of gravel and sand, comparable to silting, in the arroyo bottoms. To what extent this is directly due to the presence of cattle upon the ground or upon their effect on the ground-cover cannot be stated now.

Carl Hartley, Forest pathologist, paid the Station a brief visit on the 17th. He was especially interested in our apparently mistletoe resistant yellow pine from the standpoint of the pathologist, and made some observations to check certain theories held by him concerning bark-destroying bacteria. Accompanied by Supervisor Keithley and Roeser, he visited the Douglas fir thinning plots on the Pike to get an idea of the prevalence and destructiveness of the so-called "pitch girdle," a bark disease, which is quite common in heavy uncut sapling stands, although not especially destructive, and which, so far, has not been identified, although it is apparently related to a bacterial group causing similar damage in other sections of the country.

Roeser will spend most of his available time in securing a clean-up of the plots to be cut this year under the management plan in order that a new group of plots may be marked and measured. He will also establish additional Mc-161 and 146 reproduction plots on the area cut over during the past five years, mainly in sapling stands. Since the laborer at present employed at the Station will quit early in the month to enter college, it is expected that considerable time will necessarily have to be devoted to breaking in a new man.

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MANUSCRIPTS RECEIVED

WASHINGTON OFFICE

A New Tree Measurement Form. L. H. Reineke. (To Jour. For.)

Current Literature. Compiled by Helen E. Stockbridge. List for April-May, 1927. Mimeographed.

PACIFIC NORTHWEST

Slash Disposal in the Yellow Pine Region of the Northwest.

R. H. Westveld.

NORTHERN ROCKY MOUNTAIN

Timber Growing and Logging Practice in the Western White Pine and Larch-Fir Forests of the Northern Rocky Mts. Koch and Cunningham. (In Galley proof).

The Growth of Douglas Fir in Western Oregon and Washington -- Standard Yield Tables for Normal Forests. (Dept. Bulletin)

NORTHEASTERN

Report on European Forest Experiment Stations Visited Between May 12 and June 30, 1926. S. T. Dana.

Timber Growing and Logging Practice in the Northeast. S. T. Dana.

IN PRINT

Bruce, Donald. Timber Harvest Timber Depends on Soil Conditions. Yearbook, 1926.

Dana, S. T. Woodlots in Northeast Pay Well for Care. Yearbook, 1926.

Frothingham, E. H. Woodlots in the Piedmont Region a Profit Source. Yearbook, 1926.

Tillotson, C. R. Woodlots Too Valuable for Pasture Use. Yearbook, 1926.

Wyman, Lenthall. Turpentine Lease Form Adapted to Farmers' Needs. Yearbook, 1926.

Turpentine Pine Chipping to Get Highest Yields. Yearbook, 1926.

Hanzlik, E. J. Engelmann spruce-Lodgepole Pine. Four L Lumber News. July, 1927.

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FOREST PRODUCTS - District 1

Depreciation of Fire-Killed White Pine

Field work on this project, the plans for which were outlined in the April Report, was completed during July. A total of about 3100 logs from fire-killed stands was included in the study at the Dalkena Lumber Company's plant. The data obtained should furnish a reliable basis for determining the depreciation in this class of material which is logged the first and second years after the fire damage.

An interesting point in connection with this job is the personnel of the project crew and the interest shown generally by the District timber sale organization. Mr. Bradner of this office, who has conducted the District sawmill studies from their beginning, was in charge of the work. C. S. Webb, District Lumberman and check scaler, handled the scaling. Messrs. M. R. Brundage and A. H. Hodgson of the Products Offices of Districts 5 and 6, served as members of the crew, their assignment being arranged in order that their Districts might become familiar with the methods of study developed here. Lumberman W. G. McGillivray of the Kaniksu Forest and Head Grader Eric Matson of the Potlatch Lumber Company were the other members of the crew. During the study Logging Engineers Neff, Breen, and Drake of this District, and W. H. Gibbons, Chief of Products in District 6, spent some time on the job.

Sawmill Utilization

An article on Sawmill Utilization in the Inland Empire was prepared during the month. This, it is hoped, will be ready for publication as a Trade Journal article in the near future. The table below gives some very interesting information as to the average regional production from sound sawlogs. In comparing the results for different species, several of the factors which affect the amount of slabs, sawdust, edgings, and trims, developing in lumber manufacture must be kept in mind. These are taper, average size of log run, care and refinement in manufacture, and the type of products produced.

Western white pine, for example, has a smaller average taper than western yellow pine and greater care is ordinarily employed in its manufacture. The smaller proportional conversion of the white pine log to lumber is explained by the smaller average size of the white pine run. This will average about $9\frac{1}{2}$ logs per M, while the western yellow pine will average about 6 logs per M. To indicate the effect of size upon the amount of losses developing in lumber manufacture, it is found that the av-

verage 6-inch log produces lumber to the amount of approximately 50% of its cubic contents, while a 25-inch log yields over 75%. Or, in other words, these losses per M feet of lumber produced are at least three times as great in 6-inch logs as in 25-inch logs.

AVERAGE PRODUCTION FROM SOUND SAWLOGS IN THE INLAND EMPIRE

SPECIES	Per cent of cubic contents			
	Lumber	: Ø Trims,	: Ø Sawdust and	
	#5 Common & Btr.	: Edgings, and	: Unmerchantable	
	(Basis Green	: Merchantable	: Sizes in	
	Chain Tally)	: Lumber in	: Slabs,	
	:	: Slabs.	:	
Western White Pine	64 $\frac{1}{2}$:	6 $\frac{1}{4}$:
Western Yellow Pine	67 $\frac{1}{2}$:	7 $\frac{1}{4}$:
Western Larch	71-2/3	:	6-1/3	:
Douglas Fir	70-2/3	:	7-1/3	:
White Fir	63 $\frac{1}{2}$:	5 $\frac{1}{2}$:
AVERAGE	66-2/3	:	6-2/3	:
				26-2/3

Note: Ø At least 60% of these materials are utilized in the form of such by-products as lath, molding stock, short box, fuel wood, and sawmill fuel.

Lumber Prices and Movement

Prices	Annual	Annual	First Q.	Second Q.
	1925	1926	1927	1927
Idaho White Pine	\$37.37	\$37.77	\$38.48	\$38.41
Pondosa Pine	28.02	26.33	26.28	26.72
D. Fir and Larch	19.33	17.78	17.62	18.92
White Fir	20.14	19.10	16.46	18.02
Spruce	24.28	23.73	23.77	24.09

	July, 1926	July, 1927
Cut	183,828 M	165,597 M
Shipments	157,809 M	139,105 M

COMPARISON - First Six Months of Year

	Cut	Shipment
1920	834,149 M	838,636 M
1921	400,326 M	381,180 M
1922	574,375 M	754,032 M
1923	812,794 M	812,573 M
1924	827,195 M	779,914 M
1925	853,747 M	826,765 M
1926	857,975 M	843,340 M
1927	726,719 M	796,877 M

FOREST PRODUCTS - District 5

Heptane

A comprehensive working plan for the investigative work in respect to the tapping of Jeffrey pine for heptane has been prepared. The investigative work will be done cooperatively by the Office of Products and the California Forest Experiment Station, the former paying attention to the effect of variations in methods of tapping upon the yield, and the latter to their effect upon the health and growth of the trees. Cooperative assistance will also be rendered by the Forest Products Laboratory, especially in respect to the analysis of oleoresin. The work outlined is more extensive than can be accomplished this year and considerable portions of it will carry into next year. A peculiarly difficult factor in this investigative work to which there is no similar problem in turpentine tapping in the South, is the complications introduced by intergrading tree forms between the typical Jeffrey pine and typical western yellow pine, and the unknown nature of the limits of occurrence of the heptane characteristic of Jeffrey pine, and the terpenes characteristic of western yellow pine.

To take charge of the experimental work there has been assigned Mr. N. C. Tihomiroff, a young Russian of chemical training and experience in similar problems including the conduct of destructive distillation plants in Siberia. Mr. Tihomiroff's assignment is financed cooperatively between the Products Office and the Experiment Station.

The experimental area is located on the Lassen Forest on the east side of the Sierras, about 40 miles from Susanville. Mr. Brundage of the Products Office went to Susanville with Tihomiroff in June, and spent some time with him in starting the work. Mr. Hill made a trip to the area in July with particular reference to changes and adaptations in the plan to accommodate conditions which developed in the field.

Very interesting developments have occurred in respect to the type of apron adapted to this tapping in relation to damage to the trees. The commercial operation upon which the experimental work is based has encountered serious difficulties in respect to unseasonable weather, and also in respect to certain factors in the chemical composition of the product. They are now, however, in good producing stride.

Wood Preservation

An interesting development in this region is the prospect raised by the research department of one of the largest oil com-

panies, of producing an adequately toxic wood preservative from petroleum. There is also particular activity and interest in this territory in fireproofing and the development of preparations for that purpose.

Termite Protection in Relation to the Pacific Coast Uniform Building Code

It now seems probable that Dr. Snyder of the Bureau of Entomology will come to California and will attend the convention of the Pacific Coast Building Officials Conference at Phoenix, Arizona, in the fall. Only indirect information has been received by this office, however. This will probably afford a welcome release of considerable time which this office would otherwise have to devote to that subject.

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Mr. Johnson reporting on the work in the Coos Bay region states that "the most outstanding feature encountered was on the cut-over area of the George H. Chaney Timber Company of Coquille, Oregon. This company is operating in a mixed stand of Douglas fir, lowland white fir, western hemlock and western red cedar, the two latter comprising less than 3 per cent of the stand. Owing to the inability of the millmen of the region to market the white fir lumber, practically all logs of this species are being left in the woods. In the case of two sample acres the survey showed 30,000 and 33,000 bd. ft. respectively of bucked logs left on the ground. These logs ranged from 16 to 40 inches in diameter at the small end, mostly 24 to 36 inches, and 20 to 64 feet long, mostly 30 to 40 feet. Aside from the bucked logs a considerable amount of broken logs of sawlog size and length were left. Mr. Chaney stated that they contemplated making a trial shipment of white fir logs to the pulp plant at Salem this fall in an effort to create a market for this material."

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After completing his work at the Great Basin Station shortly after the middle of August, Mr. Chapline will accept an invitation extended by Mr. Kotok, Director of the California Forest Experiment Station, to visit the erosion work that his station has under way in southern California.

Forage Investigations

Routine Work

One plant collection was forwarded during July to the Bureau of Plant Industry for identification, and two collections were reported on to the field. 48 prints of economic notes were furnished to the field. 225 plants were mounted for the herbarium.

Thornber & Tidestrom's Flora of Arizona

At Mr. Tidestrom's request Dayton went through the grass mss. of Thornber & Tidestrom's as yet unpublished Flora of Arizona with a view particularly of seeing if all Forest Service Arizona grass species were included, incidentally checking up the synonymy and other matters to some extent. Forty-one additions were made to the list.

Miss Doris Hayes Offered Appointment as Junior Plant Ecologist

Chapline visited the University of Nebraska and personally interviewed Miss Hayes, who has now been offered and accepted appointment as Junior Plant Ecologist in the section of forage investigations effective September 15, 1927.

The Browse Bulletin Still Lives

Dayton spent the larger part of three days in conference with Dr. Coville, who is on the Board of Review, on the browse bulletin. Dr. Coville has taken a keen personal interest in this bulletin and expressed a desire to go through it all carefully with Dayton after the latter had made certain notations to expedite the review. These notations have now been made, Dr. Coville has returned to the city, and it is hoped that the bulletin will again be before Mr. Hunn shortly.

Artificial Reseeding Bulletin

The artificial reseeding bulletin, by Forsling and Dayton, has been again revised and forwarded to the Great Basin Station for a final review by Messrs. Chapline and Forsling.

Glossary of Botanical Terms to be Mimeographed

At the request of District 4 the mss. of the Botanical Glossary was forwarded to that District for mimeographing, as it was desired to use it there before the present season expires.

Strawberries for Mr. Darrow

In the March report attention was called to a request by Mr. Darrow, associate pomologist of the office of horticulture, Bureau of Plant Industry, for live western wild strawberry plants for use in breeding experiments at the Department Experimental Farm, Glenn Dale, Maryland. Mr. J. L. Peterson and Ranger Bloom of the Whitman have now forwarded Mr. Darrow 55 live strawberry plants from that Forest.

Papers on Nomenclature

Two brief papers, by Dayton, concerning the nomenclature of National Forest range plants were forwarded to the editor of the Proceedings of the Biological Society of Washington.

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DISTRICT 3

Considerable progress has been made in establishing the machinery for study of grazing utilization and management in the western yellow pine sawtimber type.

The present areas under study are cut over. The herbaceous vegetation is bunchgrass weed in type. The condition is important on the Coconino Plateau both from the standpoint of extent in area and potential productivity of soil.

Large panel, or removable, enclosures are being fenced in representative portions of the range for study of seasonal use and degree of utilization to determine management for the following conditions, in brief:

1. Main forage associations.
2. Progressive utilization governed by existing waters and surface character.
3. For maintenance or development of forage species.

4. To determine the relation between range use and natural reproduction of timber as to
 - (a) Grazing damage to existing established or potential reproduction under all conditions.
 - (b) Grazing influence in securing satisfactory timber restocking.
 - (c) Grazing influence in reducing competition between timber seedlings and herbaceous vegetation.

The usual study of the vegetation, of range management, and of stock handling is enlarged upon by establishing reproduction plots in the panel enclosures in which grazing use can be definitely controlled. Check plots are placed at large through the range in areas of service cuttings and those clean cut.

A good seed crop gives some promise of 1928 reproduction for study of small seedlings.

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GREAT BASIN EXPERIMENT STATION

Supervisors Meeting

The second annual District 4 Supervisors Meeting was held during July 6 - 9 Inclusive. The Supervisors and Assistant Supervisors from the Idaho and Wyoming Forests, were in attendance. Field trips were made to the various areas where grazing experimental projects are being carried on and the results of the projects considered to date.

Mr. Chapline of the Washington office spent two days at the meeting. Other visitors were Inspector of Grazing Douglas and Assistant Supervisor Clarke from District 2, Assistant Range Examiner Renner from District 6 and Professor George Stewart from the Utah Agricultural College.

Details of Forest Service and State Experiment Station Men

Assistant Supervisor Farrell of the Idaho National Forest, Assistant Range Examiner Renner of the Wenatchee Forest, and Ranger Harrison of the Wyoming Forest, spent the month of July on detail at the Station. They assisted on all phases of work, getting a

thorough knowledge of methods used in obtaining field data on the various projects as well as the methods used in compiling and analyzing the data. Such details of men to the experiment stations are of great value both to the men on detail and to the members of the Station staff. Probably the greatest value obtained through such contacts is finding out what the paramount fundamental problems in range management are and the best basic means by which they can be solved.

Professor George Stewart, head of the Department of Agronomy at Utah Agricultural College, spent part of June and July at the Station. Professor Stewart is very much interested in our grazing studies work and is anxious to learn our methods of solving the different National Forest grazing problems.

Field Trips

Forsling, accompanied by Inspector of Grazing Chapline of the Washington office, visited the U. S. Sheep Station near Dubois, Idaho, near the middle of July. Gerald D. Pickford, Forest Ranger on the Targhee Forest, was detailed to the Dubois station to map the quadrats which the Forest Service, in cooperation with the U. S. Sheep Station staff, has established in the various sheep paddocks.

Chapline, Forsling, Renner, Farrell and Harrison spent one day in July visiting the Poison Plant Experiment Station, Bureau of Animal Industry, near Salina, Utah. Dr. Marsh, in charge of the Station, explained the various experiments that he has under way in solving the various poisonous plant problems on the western ranges.

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JORNADA RANGE RESERVE

Range Conditions and Precipitation

The first general rains of the year fell on the 23rd, 24th, and 25th of this month. The lack of moisture was beginning to leave its mark on the most resistant plants of this region. However, a rapid response to the 1.03" to 3.80" precipitation received at various stations within the last three days is expected.

Cattle are in excellent condition. Losses have been small and the calf crop promises to be above the average for the Reserve. While the recent rains have been gentle with a minimum of surface run-off, most of the tanks in pastures No. 1 and No. 6 are beginning to fill. This will relieve the congested condition about the wells that have been pumping.

Investigative Work

Three new series of quadrats have been established this month. This, in connection with the computation of the carrying capacity and other routine and odd jobs, has taken up most of this month.

Improvements

A new adobe stucco bathroom was added to the office building this month.

Brandings

Branding of this year's calf crop was begun on the 23rd of the month and is still in progress. The proportion of steer calves runs well over 50% of the total to date.

Federal Business Association Meeting

On July 20, Mr. Campbell represented the Forest Service at the Local Federal Business Association Meeting and in the absence of Mr. Schoeller took over the duties of Secretary.

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SANTA RITA RANGE RESERVE (June and July)

Natural Revegetation

July started off well with 1.56 inches of rainfall on the 6th and 7th and forage growth responded rapidly though only to be completely dried up in the extremely hot dry period that followed and was not broken, with the exception of very light showers, until the night of the 31st when approximately one inch fell. The present outlook for a forage crop is not very favorable unless we get some real rains within the next week or so. Rainfall in the region surrounding the Reserve has been very spottet with very little forage growth except in the vicinity of Empire, Patagonia, Canella and Nogales.

Handling Stock

Stock continue in good condition with sufficient reserve feed to last for some time so that no immediate concern is felt.

However, should the summer continue dry it is very probable that some sales of calves and fat cows will be made in order to insure a conservative rate of stocking during the coming winter.

Visitors

Early in June Mr. Barnes paid a visit to the Reserve and spent several days going over the range and looking into the project work. We are thus glad to add his name to our guest book after five long years of waiting. Sorry we didn't have any longhorns for him but presume, from a note received since his departure, that he was successful in his hunt for them somewhere down in Texas.

Messrs. Swarth and Mailliard, from the California Academy of Sciences, spent the month of June at Florida Station devoting their time to the collection of birds and mammals for the Museum in San Francisco.

Messrs. Doutt, E. H. and H. W. Graham spent ten days at the Reserve headquarters collecting mammals and plants for the Carnegie Museum in Pittsburgh.

On July 31st Mr. Kearney of B.P.I. in Washington and Messrs. Harrison and Peebles from the Sacaton Station paid a visit to the Reserve in search of plant material for their herbarium collection.

(Note) We're just about out of everything collectable now, except jack rabbits but would extend a hearty welcome to anyone looking for several hundred thousand specimens of the latter.

Improvements

During July the cooperative bunk house at Florida Station was completed and made available brand new quarters for the Summer assistants at the Reserve. The new office building was also completed and will be used temporarily as living quarters by Mr. Turner and his family. An addition was also made to our present office building which resulted in greatly increasing our office space so that we can now turn around inside without upsetting a filing case or other articles of furniture.

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Two Requirements Reports were delivered by the Printing Office during July - the Douglas Fir and the Central Hardwoods; one other is already set up in type, and a fourth is now on its way to the Printing Office. With three of this series published and two more practically on the press the outlook for the early publication of the entire series is very good. Two more of the series are now awaiting editing. The remainder are in the authors' hands for revision.

Beginnings and Endings

An introduction and a summary or concluding section are usually very important parts of a report. Just for that reason their function should be thoroughly understood and their preparation should be given quite as much thought as any other one section of the report. Nobody minds if Colonel Lindberg begins his "We" with the simple statement "I was born on February 4, 1902," because most of us are in the frame of mind in which we are willing to accept anything that this writer has to tell us with considerable interest and sympathetic consideration. If we could be sure that readers would pick up Government bulletins in this same frame of mind, there would certainly be no objection to starting right out on the first page with some such statement as, "The study described in this bulletin was begun in the Androscoggin Nursery April 1, 1916, and was continued for ten years thereafter."

A number of manuscripts make their way to the Editor's office with not much more apology for existence than this sort of statement, labeled "Introduction" and comprising three to fifteen pages in which all the preliminary, uninteresting facts are hurled at the reader with the commendable idea of getting them out of the way as quickly as possible. The result is, of course, that the reader retreats with a shudder from the first page and carefully skips all the other pages covered by this warning heading "Introcution." I believe that statistics go to show that 99-2/3 per cent of the readers of light and heavy publications alike skip the introductions. The reader figures that if there is anything in that section that he needs to know about, the need will become manifest later and that if it is sufficiently urgent he can always turn back and dig around in there. Consequently, if there is anything in your report that you would rather not have the reader pay much attention to, and yet which must be included somewhere, the best place to put it is in a section entitled "Introduction." Conversely, if there is anything which the reader most certainly should have clear in his mind before he gets into the main discussion, the best thing to do with it is to tell about it clearly, frankly, and interestingly in a preliminary section of the report which is not labeled "Introduction."

The point is that there is generally some one thing or a group of related things that can be featured in the introductory section and can be further emphasized by an appropriate title for this section. For example, Show in Bulletin 1294 wanted to introduce his discussion with a statement of the difficulty that has heretofore been experienced in obtaining accurate information regarding fire damage. This in itself explains the purpose of the publication and awakens the reader's interest in the further development of this subject. There is no reason why Show should not have given this section of his report a title which indicated what it contained, and I believe that if he had done so more people would have read it more carefully than has been the case. In Bulletin 1436 Cuno has endeavored to arouse interest by entitling his first section "Importance of Dogwood and Persimmon." This is not much of a "catch" heading, but it is a great deal better than "Introduction." Even "The Region and Its Possibilities" in Bulletin 1491 and "General Situation in the Douglas Fir Region" in Bulletin 1493 are better than "Introduction." Looking through the recently published bulletins you will hardly find one in which the introductory matter can not be concentrated or centralized upon one feature and given an appropriate and interesting title accordingly. The stereotyped "Introduction" has very little excuse for being. By this, of course, I refer to the introductory matter of a specific discussion and not to any special introduction such as that written by Colonel Greeley for the whole series of Requirements Reports.

That unequalled writer of prefaces, G. B. Shaw, has claimed that a preface should be written last. This is good advice, also, to the writer of scientific reports. If the introductory section is written after the main part of the report is finished the chances are that it will be less diffuse and will focus directly upon the matters of greatest importance and interest to the reader.

Since we are recommending writing the introduction last, it might be well to balance this with advice to write the summary first. At present, the summary is in most instances a rather perfunctory affair, and often seems to be inspired simply by a desire on the part of the writer to go through all the motions that other authors of reports have gone through. In most instances the writer appears merely to have elaborated his outline. A summary of this sort is not very helpful to the reader, not even to the one who picks up the publication and turns to the summary in order to get the gist of the discussion without having to read further. Instead of a deliberate summary, item by item, of the points brought out in the discussion, a much more satisfactory procedure is to focus the summary upon some principle item or items of interest in the discussion and bring in whatever additional facts it is desired to summarize as supplementary to the emphasis upon these points. If your data have been properly digested it will be easy to sketch out such a summary, before you start writing, as a preliminary to

the main discussion. At that stage your point of view on the whole study will be reasonably clear and you will have fairly definitely in mind what features deserve the most emphasis. A summary written out at this time and laid away may be found later on to be quite suitable with but very little change.

Some reports do not lend themselves very easily to a summary and where this is the case the summary may well be omitted entirely. Munger in Bulletin 1493 has omitted to summarize his data and conclusions, feeling that they are stated with sufficient clearness and brevity in the main discussion to require no further enumeration. Zon in his forthcoming Requirements Report on the Lake States has for his summary a number of statements in tabular form, one for each type, giving the recommendations for minimum requirements and desirable practice. McIntyre in a forthcoming bulletin on slash disposal in the western yellow pine type of the Southwest omits his summary for the reason that to attempt to summarize the recommendations given in the report would be practically to give the entire report twice.

In the majority of reports a summary is quite desirable. However, just as it is wise to take the curse off the "Introduction" by giving it a more interesting title, so it is often effective to disguise somewhat the summary by a more descriptive title. Tillotson in Bulletin 1491 entitles his final section "Responsibility of the Timberland Owner and of the Public," and yet this is in effect no more than the typical good summary somewhat disguised. In Bulletin 1402 Show similarly sugar-coats his summary by placing it as a subordinate section entitled "The Opportunities for Private Forestry." If the attempt is made to vary the usual formula by substituting some other title for "Summary," the substitute title should, of course, designate clearly what it presents, so that it may be readily consulted.

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Mr. Chapline also attended the Western States Extension Conference at Reno, Nevada, July 11 to 14, and presented a statement on range research and the range extension program. The Secretary of Agriculture gave a very inspiring address, emphasizing particularly the need for sound agricultural programs based upon thoroughly analyzed facts. The Western Extension organization is assuming a most important role in coordinating the efforts of organizations concerned with agriculture in the West, and in pointing effort toward the accumulation and presentation of facts. Among other things, the conference went on record as approving control of the public domain and a more intelligent application of the Homestead laws. Conservative grazing and adequate feed for range livestock throughout the year, but especially during the critical spring period, was urged. The Forest Service was commended for its range research and for its cooperation in furthering the extension program.

Mr. Chapline spent two days with Mr. Forsling at the sheep experiment station at Dubois, Idaho. The most impressive feature was the vigor of the vegetation, particularly palatable grasses and weeds on areas grazed conservatively in spring and fall. This was especially noticeable under grazing deferred until fall on alternate years.

After completing his work at the Great Basin Station shortly after the middle of August, Mr. Chapline will accept an invitation extended by Mr. Kotok, Director of the California Forest Experiment Station, to visit the erosion work that his station has under way in southern California.

Forage Investigations

Routine Work

One plant collection was forwarded during July to the Bureau of Plant Industry for identification, and two collections were reported on to the field. 48 prints of economic notes were furnished to the field. 225 plants were mounted for the herbarium.

Thornber & Tidestrom's Flora of Arizona

At Mr. Tidestrom's request Dayton went through the grass mss. of Thornber & Tidestrom's as yet unpublished Flora of Arizona with a view particularly of seeing if all Forest Service Arizona grass species were included, incidentally checking up the synonymy and other matters to some extent. Forty-one additions were made to the list.

Miss Doris Hayes Offered Appointment as Junior Plant Ecologist

Chapline visited the University of Nebraska and personally interviewed Miss Hayes, who has now been offered and accepted appointment as Junior Plant Ecologist in the section of forage investigations effective September 15, 1927.

The Browse Bulletin Still Lives

Dayton spent the larger part of three days in conference with Dr. Coville, who is on the Board of Review, on the browse bulletin. Dr. Coville has taken a keen personal interest in this bulletin and expressed a desire to go through it all carefully with Dayton after the latter had made certain notations to expedite the review. These notations have now been made, Dr. Coville has returned to the city, and it is hoped that the bulletin will again be before Mr. Hunn shortly.

Artificial Reseeding Bulletin

The artificial reseeding bulletin, by Forsling and Dayton, has been again revised and forwarded to the Great Basin Station for a final review by Messrs. Chapline and Forsling.

Glossary of Botanical Terms to be Mimeographed

At the request of District 4 the mss. of the Botanical Glossary was forwarded to that District for mimeographing, as it was desired to use it there before the present season expires.

Strawberries for Mr. Darrow

In the March report attention was called to a request by Mr. Darrow, associate pomologist of the office of horticulture, Bureau of Plant Industry, for live western wild strawberry plants for use in breeding experiments at the Department Experimental Farm, Glenn Dale, Maryland. Mr. J. L. Peterson and Ranger Bloom of the Whitman have now forwarded Mr. Darrow 55 live strawberry plants from that Forest.

Papers on Nomenclature

Two brief papers, by Dayton, concerning the nomenclature of National Forest range plants were forwarded to the editor of the Proceedings of the Biological Society of Washington.

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DISTRICT 3

Considerable progress has been made in establishing the machinery for study of grazing utilization and management in the western yellow pine sawtimber type.

The present areas under study are cut over. The herbaceous vegetation is bunchgrass weed in type. The condition is important on the Coconino Plateau both from the standpoint of extent in area and potential productivity of soil.

Large panel, or removable, enclosures are being fenced in representative portions of the range for study of seasonal use and degree of utilization to determine management for the following conditions, in brief:

1. Main forage associations.
2. Progressive utilization governed by existing waters and surface character.
3. For maintenance or development of forage species.

4. To determine the relation between range use and natural reproduction of timber as to
 - (a) Grazing damage to existing established or potential reproduction under all conditions.
 - (b) Grazing influence in securing satisfactory timber restocking.
 - (c) Grazing influence in reducing competition between timber seedlings and herbaceous vegetation.

The usual study of the vegetation, of range management, and of stock handling is enlarged upon by establishing reproduction plots in the panel enclosures in which grazing use can be definitely controlled. Check plots are placed at large through the range in areas of service cuttings and those clean cut.

A good seed crop gives some promise of 1928 reproduction for study of small seedlings.

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GREAT BASIN EXPERIMENT STATION

Supervisors Meeting

The second annual District 4 Supervisors Meeting was held during July 6 - 9 Inclusive. The Supervisors and Assistant Supervisors from the Idaho and Wyoming Forests, were in attendance. Field trips were made to the various areas where grazing experimental projects are being carried on and the results of the projects considered to date.

Mr. Chapline of the Washington office spent two days at the meeting. Other visitors were Inspector of Grazing Douglas and Assistant Supervisor Clarke from District 2, Assistant Range Examiner Renner from District 6 and Professor George Stewart from the Utah Agricultural College.

Details of Forest Service and State Experiment Station Men

Assistant Supervisor Farrell of the Idaho National Forest, Assistant Range Examiner Renner of the Wenatchee Forest, and Ranger Harrison of the Wyoming Forest, spent the month of July on detail at the Station. They assisted on all phases of work, getting a

thorough knowledge of methods used in obtaining field data on the various projects as well as the methods used in compiling and analyzing the data. Such details of men to the experiment stations are of great value both to the men on detail and to the members of the Station staff. Probably the greatest value obtained through such contacts is finding out what the paramount fundamental problems in range management are and the best basic means by which they can be solved.

Professor George Stewart, head of the Department of Agronomy at Utah Agricultural College, spent part of June and July at the Station. Professor Stewart is very much interested in our grazing studies work and is anxious to learn our methods of solving the different National Forest grazing problems.

Field Trips

Forsling, accompanied by Inspector of Grazing Chapline of the Washington office, visited the U. S. Sheep Station near Dubois, Idaho, near the middle of July. Gerald D. Pickford, Forest Ranger on the Targhee Forest, was detailed to the Dubois station to map the quadrats which the Forest Service, in cooperation with the U. S. Sheep Station staff, has established in the various sheep paddocks.

Chapline, Forsling, Renner, Farrell and Harrison spent one day in July visiting the Poison Plant Experiment Station, Bureau of Animal Industry, near Salina, Utah. Dr. Marsh, in charge of the Station, explained the various experiments that he has under way in solving the various poisonous plant problems on the western ranges.

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JORNADA RANGE RESERVE

Range Conditions and Precipitation

The first general rains of the year fell on the 23rd, 24th, and 25th of this month. The lack of moisture was beginning to leave its mark on the most resistant plants of this region. However, a rapid response to the 1.03" to 3.60" precipitation received at various stations within the last three days is expected.

Cattle are in excellent condition. Losses have been small and the calf crop promises to be above the average for the Reserve. While the recent rains have been gentle with a minimum of surface run-off, most of the tanks in pastures No. 1 and No. 6 are beginning to fill. This will relieve the congested condition about the wells that have been pumping.

Investigative Work

Three new series of quadrats have been established this month. This, in connection with the computation of the carrying capacity and other routine and odd jobs, has taken up most of this month.

Improvements

A new adobe stucco bathroom was added to the office building this month.

Brandings

Branding of this year's calf crop was begun on the 23rd of the month and is still in progress. The proportion of steer calves runs well over 50% of the total to date.

Federal Business Association Meeting

On July 20, Mr. Campbell represented the Forest Service at the Local Federal Business Association Meeting and in the absence of Mr. Schoeller took over the duties of Secretary.

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SANTA RITA RANGE RESERVE (June and July)

Natural Revegetation

July started off well with 1.58 inches of rainfall on the 6th and 7th and forage growth responded rapidly though only to be completely dried up in the extremely hot dry period that followed and was not broken, with the exception of very light showers, until the night of the 31st when approximately one inch fell. The present outlook for a forage crop is not very favorable unless we get some real rains within the next week or so. Rainfall in the region surrounding the Reserve has been very spotted with very little forage growth except in the vicinity of Empire, Patagonia, Canella and Nogales.

Handling Stock

Stock continue in good condition with sufficient reserve feed to last for some time so that no immediate concern is felt.

However, should the summer continue dry it is very probable that some sales of calves and fat cows will be made in order to insure a conservative rate of stocking during the coming winter.

Visitors

Early in June Mr. Barnes paid a visit to the Reserve and spent several days going over the range and looking into the project work. We are thus glad to add his name to our guest book after five long years of waiting. Sorry we didn't have any longhorns for him but presume, from a note received since his departure, that he was successful in his hunt for them somewhere down in Texas.

Messrs. Swarth and Mailliard, from the California Academy of Sciences, spent the month of June at Florida Station devoting their time to the collection of birds and mammals for the Museum in San Francisco.

Messrs. Doutt, E. H. and H. W. Graham spent ten days at the Reserve headquarters collecting mammals and plants for the Carnegie Museum in Pittsburgh.

On July 31st Mr. Kearney of B.P.I. in Washington and Messrs. Harrison and Peebles from the Sacaton Station paid a visit to the Reserve in search of plant material for their herbarium collection.

(Note) We're just about out of everything collectable now, except jack rabbits but would extend a hearty welcome to anyone looking for several hundred thousand specimens of the latter.

Improvements

During July the cooperative bunk house at Florida Station was completed and made available brand new quarters for the Summer assistants at the Reserve. The new office building was also completed and will be used temporarily as living quarters by Mr. Turner and his family. An addition was also made to our present office building which resulted in greatly increasing our office space so that we can now turn around inside without upsetting a filing case or other articles of furniture.

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Two Requirements Reports were delivered by the Printing Office during July - the Douglas Fir and the Central Hardwoods; one other is already set up in type, and a fourth is now on its way to the Printing Office. With three of this series published and two more practically on the press the outlook for the early publication of the entire series is very good. Two more of the series are now awaiting editing. The remainder are in the authors' hands for revision.

Beginnings and Endings

An introduction and a summary or concluding section are usually very important parts of a report. Just for that reason their function should be thoroughly understood and their preparation should be given quite as much thought as any other one section of the report. Nobody minds if Colonel Lindberg begins his "We" with the simple statement "I was born on February 4, 1902," because most of us are in the frame of mind in which we are willing to accept anything that this writer has to tell us with considerable interest and sympathetic consideration. If we could be sure that readers would pick up Government bulletins in this same frame of mind, there would certainly be no objection to starting right out on the first page with some such statement as, "The study described in this bulletin was begun in the Andros-coggan Nursery April 1, 1916, and was continued for ten years thereafter."

A number of manuscripts make their way to the Editor's office with not much more apology for existence than this sort of statement, labeled "Introduction" and comprising three to fifteen pages in which all the preliminary, uninteresting facts are hurled at the reader with the commendable idea of getting them out of the way as quickly as possible. The result is, of course, that the reader retreats with a shudder from the first page and carefully skips all the other pages covered by this warning heading "Introcution." I believe that statistics go to show that 99-2/3 per cent of the readers of light and heavy publications alike skip the introductions. The reader figures that if there is anything in that section that he needs to know about, the need will become manifest later and that if it is sufficiently urgent he can always turn back and dig around in there. Consequently, if there is anything in your report that you would rather not have the reader pay much attention to, and yet which must be included somewhere, the best place to put it is in a section entitled "Introduction." Conversely, if there is anything which the reader most certainly should have clear in his mind before he gets into the main discussion, the best thing to do with it is to tell about it clearly, frankly, and interestingly in a preliminary section of the report which is not labeled "Introduction."

The point is that there is generally some one thing or a group of related things that can be featured in the introductory section and can be further emphasized by an appropriate title for this section. For example, Show in Bulletin 1294 wanted to introduce his discussion with a statement of the difficulty that has heretofore been experienced in obtaining accurate information regarding fire damage. This in itself explains the purpose of the publication and awakens the reader's interest in the further development of this subject. There is no reason why Show should not have given this section of his report a title which indicated what it contained, and I believe that if he had done so more people would have read it more carefully than has been the case. In Bulletin 1436 Cuno has endeavored to arouse interest by entitling his first section "Importance of Dogwood and Persimmon." This is not much of a "catch" heading, but it is a great deal better than "Introduction." Even "The Region and Its Possibilities" in Bulletin 1491 and "General Situation in the Douglas Fir Region" in Bulletin 1493 are better than "Introduction." Looking through the recently published bulletins you will hardly find one in which the introductory matter can not be concentrated or centralized upon one feature and given an appropriate and interesting title accordingly. The stereotyped "Introduction" has very little excuse for being. By this, of course, I refer to the introductory matter of a specific discussion and not to any special introduction such as that written by Colonel Greeley for the whole series of Requirements Reports.

That unequalled writer of prefaces, G. B. Shaw, has claimed that a preface should be written last. This is good advice, also, to the writer of scientific reports. If the introductory section is written after the main part of the report is finished the chances are that it will be less diffuse and will focus directly upon the matters of greatest importance and interest to the reader.

Since we are recommending writing the introduction last, it might be well to balance this with advice to write the summary first. At present, the summary is in most instances a rather perfunctory affair, and often seems to be inspired simply by a desire on the part of the writer to go through all the motions that other authors of reports have gone through. In most instances the writer appears merely to have elaborated his outline. A summary of this sort is not very helpful to the reader, not even to the one who picks up the publication and turns to the summary in order to get the gist of the discussion without having to read further. Instead of a deliberate summary, item by item, of the points brought out in the discussion, a much more satisfactory procedure is to focus the summary upon some principle item or items of interest in the discussion and bring in whatever additional facts it is desired to summarize as supplementary to the emphasis upon these points. If your data have been properly digested it will be easy to sketch out such a summary, before you start writing, as a preliminary to

the main discussion. At that stage your point of view on the whole study will be reasonably clear and you will have fairly definitely in mind what features deserve the most emphasis. A summary written out at this time and laid away may be found later on to be quite suitable with but very little change.

Some reports do not lend themselves very easily to a summary and where this is the case the summary may well be omitted entirely. Munger in Bulletin 1493 has omitted to summarize his data and conclusions, feeling that they are stated with sufficient clearness and brevity in the main discussion to require no further enumeration. Zon in his forthcoming Requirements Report on the Lake States has for his summary a number of statements in tabular form, one for each type, giving the recommendations for minimum requirements and desirable practice. McIntyre in a forthcoming bulletin on slash disposal in the western yellow pine type of the Southwest omits his summary for the reason that to attempt to summarize the recommendations given in the report would be practically to give the entire report twice.

In the majority of reports a summary is quite desirable. However, just as it is wise to take the curse off the "Introduction" by giving it a more interesting title, so it is often effective to disguise somewhat the summary by a more descriptive title. Tillotson in Bulletin 1491 entitles his final section "Responsibility of the Timberland Owner and of the Public," and yet this is in effect no more than the typical good summary somewhat disguised. In Bulletin 1402 Show similarly sugar-coats his summary by placing it as a subordinate section entitled "The Opportunities for Private Forestry." If the attempt is made to vary the usual formula by substituting some other title for "Summary," the substitute title should, of course, designate clearly what it presents, so that it may be readily consulted.

To borrow a figure from the carpenter's bench, the preliminary section of a report sets the nail, the general discussion drives it home, and the summary clinches it.

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